POLI 395: Introduction to Statistics

1075 DCH, MWF 11:00a-11:50a

Rick K. Wilson
Professor of Political Science
Rice University

Office: 118 Herzstein Hall
Office Hours: M W 1:00 – 2:00 PM
E-mail: rkw@rice.edu
Phone: 713.348.3352

Course Objectives and Learning Outcomes

This course introduces students to basic ideas in scientific epistemology, social science research design, statistical analysis, and the application of all these ideas to substantive questions in political science.

Students will be able to:

1. understand basic approaches to the scientific study of the social world to substantive topics in political science;
2. execute and interpret statistical analysis of quantitative political data to answer about substantive questions in political science; and
3. recognize and understand threats to inference based on empirical data in political science, including the weaknesses of research designs and statistical analyses.

Grading Policies and Assignment Details

Grade Components:

- Homework: 25%
- Exam 1: 25%
- Exam 2: 25%
- Final Exam: 25%

Grading Scale:

100%-97%: A+
96.9%-93%: A
92.9%-90%: A-
89.9%-87%: B+
86.9%-83%: B
82.9%-80%: B-
79.9%-77%: C+
76.9%-73%: C
72.9%-70%: C-
69.9%-67%: D+
66.9%-63%: D
62.9%-60%: D-
>59.5%: F

Exams: There will be three exams in this class, two midterms and a final. All exams are cumulative, but will focus on material learned since the last exam. Exams will be take home, you will have 90 minutes in which to take the exam and you will be bound by the honor code when taking the exam. No materials, references, or other students may be consulted during an exam.

Homework: Homework problem sets will be distributed on OwlSpace. I encourage collaborative work on problem sets: the goal of a homework problem set is to help you learn the material and enable you to perform well on the (non-collaborative!) exams. With that said, simply copying another student's homework answers is not permitted and will be treated as academic dishonesty.

Attendance: Attendance is advisable. Anything taught in class is testable material, and not everything I teach in class will be in the course reading material.

COURSE POLICIES

T/A Office Hours: The teaching assistant for this class is Cem Birol, a PhD student in the political science department. Cem will hold office hours for three hours per week. You are welcome to have Cem assist you with questions that you may have. The time and location of these office hours are Wednesday, 9:00 AM – 11:00 AM, and Tuesday, 10:00 AM – 11:00 AM in Herzstein 123.

Late Work: Assignments are due at the date and time I specify for the assignment. Late homeworks will be marked off at 5 percentage points for the first 24 hours late, and an additional 10 percentage points for every subsequent 24 hours late.

Important note: Students are responsible for submitting working, uncorrupted files for all assignments. If a file is corrupted and needs to be re-sent, and re-sending happens after the assignment deadline, a late penalty will be assessed.

Exams may not be taken late. Failing to take the exam at the scheduled time will result in no credit for the exam.

Penalties for late homeworks or missed exams may be waived under the following three circumstances:

(1) a death in the immediate family (parent, spouse, sibling, or child) within two weeks before the assignment due date;
(2) in the event of an unforeseeable medical emergency affecting you, your spouse, or your child; or
(3) participation in a Rice-sponsored academic or sporting event.

In the event of (1) or (3), you must give me **at least 24 hours advance notice and preferably more** (via e-mail or a phone call) that you will miss the exam/homework, or it may not be made up. I may require supporting documentation. All penalty waivers are at the discretion of the instructor. Under these circumstances, I will extend your homework due date or schedule you a make-up exam time. **Important note: conflicts with a work schedule, non-academic trip, or vacation are not a**

valid reason to miss an exam or any other assignment and cannot be the basis for a penalty waiver.

Honor Code/Academic Misconduct: All forms of academic misconduct will be handled according to the Rice University Honor Code. Details on the Honor Code are available at http://honor.rice.edu/honor-system-handbook/.

If you ever have any questions about what you should do to stay within the honor code on a particular assignment, **contact me with your question and I can assist you**. I cannot guarantee a timely response unless you contact me at least 24 hours in advance of the time the assignment is due.

Students with Disabilities: If you have a disability and require accommodation in this class, please contact me as soon as possible (within the first two weeks of class) to discuss these accommodations. You will also need to contact the Disability Support Services Office (telephone extension: 5841) in the Allen Center.

Syllabus Change Policy: All policies of this syllabus may be changed by Prof. Wilson with advance notice.

COURSE MATERIALS

Required Texts:

- Kellstedt and Whitten. 2013. *The Fundamentals of Political Science Research, Second Edition.* Cambridge University Press.
- James E. Monogan III. 2015. *Political Analysis Using R.* Springer.

Optional Texts:

- Maindonald and Braun. 2013. *Data Analysis and Graphics using R: An Example Based Approach, Third Edition.* Cambridge University Press. (Expensive, but comprehensive. Buy it if you think you'll be pursuing statistics in the future.)
- Veneables, Smith and the R Core Team. 2015. An Introduction to R. Version 3.2.3. https://cran.r-project.org/doc/manuals/R-intro.pdf (This is free and is a nice overview of R.)

Other readings are available on the OWL-Space website.

Software: This course will teach material primarily through R. R is free and available for Windows and Macintosh from http://cran.r-project.org/.

I recommend installing The RStudio IDE environment for writing and executing code in R; RStudio is also free and available for Windows and Macintosh at http://www.rstudio.com.

All students must have a valid Rice e-mail address and login (and access to the OWL-space website) to participate in this course.

COURSE OUTLINE AND ASSIGNED READINGS

Date	Topic	Readings
Jan. 11	Introduction	
Jan. 12	Installing R/RStudio and Data Sets	• Monogan, Ch. 1, Ch. 2.1-2.4
Jan 15	Descriptive Statistics and Graphs with R/RStudio	• Monogan, Ch. 2.5-2.6, Ch. 3.1-3.2
Jan. 15	Assignment 1 On OwlSpace	
Jan. 18	MLK Day – No Class	
Jan. 20	Is political science really science?	• Kellstedt and Whitten, Ch. 1 up to and including Section 1.2. • Alan Musgrave, "How Popper [Might Have] Solved the Problem of Induction." *Philosophy* 19 (January 2004): pp. 19-31. URL: http://goo.gl/a1Tqfl. • Andrew Ehrenberg, "Even the Social Sciences Have Laws." *Nature* 365 (September 30, 1993): p. 385. URL: http://www.nature.com/nature/journal/v365/n6445/pdf/365385a0.pdf • Alex Rosenberg and Tyler Curtain, "What is Economics Good for?" *The New York Times* (August 24, 2013). URL: http://goo.gl/n1aRD0.
Jan. 20	Assignment 1 Due	
Jan. 22	**Research questions, theories, concepts, and hypotheses**	• Kelllstedt and Whitten, Ch. 1 and 2.

Jan. 25	**Research design I: the logic of experimentation and causal inference**	• Kellstedt and Whitten, Ch. 3 and Ch. 4 up to and including Section 4.2.
Jan. 27	**Research design I: the logic of experimentation and causal inference**	• Joel Turner, "The Messenger Overwhelming the Message: Ideological Cues and Perceptions of Bias in Television News." *Political Behavior* 29 (December 2007): 441-464. URL: http://goo.gl/ENqx9w • Catherine Eckel, Sara Godoy, Enrique Fatas and Rick K. Wilson. 2015. "Group Extinction." (OwlSpace).
Jan. 29	**Research Design II: non-experimental, large sample designs**	• Kellstedt and Whitten, Ch. 4, Section 4.3-end. • Alan S. Gerber and Donald P. Green, "Do Phone Calls Increase Voter Turnout? A Field Experiment." *Public Opinion Quarterly* 65 (Spring 2001). URL: http://goo.gl/KAdNMW. • Monogan Ch. 3.3-3.4
Jan. 29	Assignment 2 On OwlSpace	
Feb. 1	**Research Design II: non-experimental, large sample designs**	• Jeffrey S. DeSimone, "Fraternity Membership and Binge Drinking." *Journal of Health Economics* 26 (September 2007), 950-967. URL: http://goo.gl/nBK9ON. • James Fowler, "The Colbert Bump in Campaign Donations: More Truthful than Truthy," PS: Political Science and Politics 41 (July 2008): 533-539. URL: http://goo.gl/O2Ujt2.
Feb. 1	Assignment 2 Due	
Feb. 3	**Research Design III: non-experimental, case study designs**	• James Mahoney. "Strategies of Causal Inference in Small-N Analysis." *Sociological Methods and Research* 28 (2000): 387-424. URL: http://goo.gl/HCjR6O. • Ashutosh Varshney, "Ethnic Conflict and Civil Society: India and Beyond." World Politics 53 (April 2001), 362-398,

		especially 370-374. URL: http://goo.gl/eZnmCV.
Feb. 5	**Measurement: levels of measurement, reliability, and validity**	• Kellstedt and Whitten, Ch. 5 up to and including Section 5.8.
Feb. 5	Assignment 3 on OwlSpace	
Feb. 8	**Measurement: levels of measurement, reliability, and validity**	• Jeffrey A. Segal and Albert D. Cover, "Ideological Values and the Votes of US Supreme Court Justices." *American Political Science Review* 83 (June 1989), 557-564. URL: http://goo.gl/Wxpc7N.
Feb. 8	Assignment 3 Due	
*** Exam One Cutoff ***		
Feb. 10	**Techniques for and problems with social scientific data collection**	• Burt Monroe, Michael Colaresi, and Kevin Quinn. "Fightin' Words: Lexical Feature Selection and Evaluation for Identifying the Content of Political Conflict." *Political Analysis* 16 (2008): 372-403. URL: http://pan.oxfordjournals.org/content/16/4/372.full.pdf .
Feb. 12	**Techniques for and problems with social scientific data collection**	• Steven Levitt and Sudhir Venkatesh, "An Economic Analysis of a Drug-Selling Gang's Finances." *Quarterly Journal of Economics* 115 (2000): 755-789. URL: http://goo.gl/lZrv9F. • Yale IRB Training, "Introduction/Ethical Overiew." URL: http://goo.gl/HKzTf8. Special note: make sure to read the following links the module: "Introduction" (http://goo.gl/HKzTf8), "Respect for Persons" (http://goo.gl/FeP3Ov), "Beneficence" (http://goo.gl/17F6fh), "Justice" (http://goo.gl/KGNtYc), and "The importance of conducting research ethically" (http://goo.gl/7BXOZX).
Feb. 12	Exam 1 Distributed	

Feb. 15	**Descriptive Statistics**	• Kellstedt and Whitten, Ch. 5. from Section 5.9 to the end • Monogan, Ch. 4
Feb. 15	Exam 1 Due	
Feb. 17	**Probability distributions and sampling**	• Kellstedt and Whitten, Chapter 6. • Monogan, Review Ch. 3.
Feb. 19	**Probability distributions and sampling**	• Kellstedt and Whitten, Chapter 6.
Feb. 19	Assignment 4 on OwlSpace	
Feb. 22	**Basic hypothesis testing**	• Kellstedt and Whitten, Ch. 7, Sections 7.1-7.3 and 7.4.2.
Feb. 22	Assignment 4 Due	
Feb. 24	**Basic hypothesis testing**	• Jeffrey J. Mondak, "Newspapers and Political Awareness." *American Journal of Political Science* 39 (May 1995); see especially pp. 523-525, for a two-sample t-test. URL: http://goo.gl/oydzPW.
Feb. 26	**Basic hypothesis testing**	• Monogan, Ch. 5.1
Feb. 29-Mar. 4	Spring Break	
Mar. 7	**Crosstabs and the χ^2 test**	• Kellstedt and Whitten, Ch. 7, Section 7.4.1 • Monogan, Ch. 5.2. • Second look: Alan S. Gerber and Donald P. Green, "Do Phone Calls Increase Voter Turnout? A Field Experiment." *Public Opinion Quarterly* 65 (Spring 2001), 75-85; see especially p. 79 for data for a chi-squared test. URL: http://goo.gl/KAdNMW.
Mar. 9	**Correlation**	• Kellstedt and Whitten, Ch. 7, Section 7.4.3
Mar. 11	**Correlation**	• Amy Caiazza, "Does Women's

		Representation in Elected Office Lead to Women-Friendly Policy?" *Women and Politics* 26 (2004), 35-70. URL: http://goo.gl/C417VH. • Monogan, Ch. 5.3
Mar. 11	Exam 2 Distributed	
***** Exam Two Cutoff *****		
Mar. 14	Exam 2 Due	
Mar. 14	**Regression I: theory and basics**	• Kellstedt and Whitten, Ch. 8., Sections 8.1-8.4.
Mar. 16	**Regression I: theory and basics**	• Monogan, Ch. 6.1
Mar. 18	**Regression I: theory and basics**	<TBA>
Mar. 18	Assignment 4 on OwlSpace	
Mar. 21	**Regression II: inference, multiple regression, and interpretation**	• Kellstedt and Whitten, Ch. 9
Mar. 21	Assignment 4 Due	
Mar. 23	**Regression II: inference, multiple regression, and interpretation**	• Monogan, Ch. 6, Sections 6.2.1-6.2.3
Mar. 25	**Regression II: inference, multiple regression, and interpretation**	<TBA>
Mar. 25	Assignment 5 on OwlSpace	
Mar. 28	**Regression III: applied examples and categorical explanatory variables**	• Kellstedt and Whitten, Ch. 10, Sections 10.1-10.2

Mar. 28	Assignment 5 Due	
Mar. 30	**Regression III: applied examples and categorical explanatory variables**	• Monogan, Ch. 6, Sections 6.2.4-6.2.5.
April 1	Break	
April 4	**Regression III: applied examples and categorical explanatory variables**	• John J. Donohue III and Steven D. Levitt, "The Impact of Legalized Abortion on Crime," *The Quarterly Journal of Economics* 46 (May 2001): 379-420. URL: http://goo.gl/gtLIlf. • Alan Abramowitz, "Forecasting the 2008 Presidential Election with the Time-for-Change Model." *PS: Political Science and Politics* 41 (October 2008): 691-695. URL: http://goo.gl/DLckXv.
April 6	**LPM, logit and probit I: studying binary dependent variables**	• Kellstedt and Whitten, Ch. 11, Sections 11.1-11.2
April 8	**LPM, logit and probit I: studying binary dependent variables**	• Monogan Ch. 7, Sections 7.1
April 8	Assignment 6 on OwlSpace	
April 11	**LPM, logit and probit I: studying binary dependent variables**	<TBA>
April 11	Assignment 6 Due	
April 13	**Logit and probit II: plotting and interpreting marginal effects**	• G. King, M. Tomz, and J. Wittenberg, "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science* 44 (2000): 347-361. URL: http://goo.gl/9StFf8.
April 15	**Logit and probit II: plotting and interpreting marginal**	• D. Sunshine Hillygus and Todd G. Shields, "Moral Issues and Voter Decision Making in the 2004 Presidential Election." *PS: Political Science and Politics* (April 2005),

	effects	201-209
April 15	Assignment 7 on OwlSpace	
April 18	**Interaction effects**	• Kellstedt and Whitten, Ch. 10, Section 10.3 • T. Brambor, W. R. Clark, and M. Golder, "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14 (2006): 63-82. URL: http://goo.gl/iQrY5a.
April 22	Assignment 7 Due	
April 20	**Interaction effects**	• Justin Esarey and Gina Chirillo, "'Fairer Sex' or Purity Myth? Corruption, Gender, and Institutional Context." *Politics and Gender* (forthcoming). URL: http://goo.gl/2yusN0.
April 22	**Conclusion**	• Kellstedt and Whitten, Ch. 12
April 22	Exam 3 Distributed	
May 4	Exam 3 Due	